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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,864	03/31/2004	Abdul Ali	U 015122-5	5618
140 7590 01/08/2007 LADAS & PARRY 26 WEST 61ST STREET NEW YORK, NY 10023			EXAMINER KRISHNAN, MALINI	
			ART UNIT	PAPER NUMBER
			1714	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/08/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/814,864	Applicant(s) ALI ET AL.	
	Examiner Malini Krishnan	Art Unit 1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Objections

2. Claim 3 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n).
3. Claims 5 and 6 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only, and cannot depend from any other multiple dependent claim. See MPEP § 608.01(n).
4. Accordingly, the claims 3-6 have not been further treated on the merits.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3 and 4 recite the limitation "the promoter" in lines 15 and 24 respectively. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yan ('201), hereinafter referred to as Yan, in view of Longwell ('094), herein referred to as Longwell.

Yan discloses a device as well as a process for reducing the amount of organic sulfur in coal. The high-sulfur coal is first crushed to a size less than 3 mesh, preferably between 40 mesh and 200 mesh (U.S. Sieve Series). The reactor has three zones. The bottom zone, interpreted to be the same as the claimed "steam heating zone", is maintained at a temperature of about 900-1500°F. Steam introduced to this zone maintains the temperature. The second zone, interpreted to be the same as the

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claimed "promoter zone" is maintained at a temperature of 1800-3000°F. Pulverized coal is fed to the third zone, interpreted to be the same as the claimed "reaction zone", which has a temperature in the range of 1100-1700°F to ensure effective desulphurization of the coal. The upwardly moving synthesis gas fluidizes an incoming stream of pulverized coal in the third zone, and a low-sulfur solid fuel, having less than 1% sulfur content, is produced. Residence time in the third, or reaction, zone can be between 10 seconds and 100 minutes depending on desired yields. The low-sulfur solid fuel and the sulfur-containing fluid phases are then separated. Yan discloses a cyclone as a preferred embodiment of separation, but recognizes that other conventional separation means known in the art can be used (Col. 5, lines 1-10, 60-68; Col. 6, lines 5-15, 57-66; Col. 7, lines 44-45, 56-61).

Yan does not disclose the reactor being placed into a tubular furnace.

Longwell discloses a reactor for desulfurizing fuel, which is placed in a tube furnace. The furnace contained additional heating elements to allow a uniform axial temperature profile over the length of the reactor (Col. 4, lines 31-37).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to place the reactor of Yan in a furnace, as described by Longwell because it would allow the temperature to be easily maintained uniformly through the reactor.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yan in view of Longwell, and further in view of Dolan ('785), hereinafter referred to as Dolan.

The discussion of Yan and Longwell in paragraph 9 above is herein incorporated by reference. Longwell also discloses quartz wool insulation in the reactor. The use of quartz wool is advantageous because of the high temperature properties and chemical inertness of quartz (Col. 4, lines 11-37).

Neither Yan nor Longwell disclose the furnace made of Silliminite.

Dolan discloses that heat storage bodies are generally composed of materials including sillimanite. The materials are chosen based upon their physical properties such as heat storage capacities, specific heat, thermal conductivity, and density (Col. 1, lines 28-34).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to utilize a silliminite furnace in the process of Yan and Longwell in order to make use of the advantages of the physical properties of silliminite, enhancing the use of the furnace as a heat storage facility.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yan in view of Longwell, and further in view of McKinley ('845), hereinafter referred to as McKinley.

The discussions of Yan and Longwell in paragraphs 9 and 10 above are herein incorporated by reference.

Neither Yan nor Longwell disclose the use of a series of bubblers containing ammoniacal cadmium chloride solution.

McKinley discloses passing hydrogen sulfide containing gas through a series of bubblers containing a cadmium chloride solution. In doing so, the amount of hydrogen sulfide present in the gas was measured (Col. 4, lines 66-75).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to pass the gas evolved from the process of Yan and Longwell through the bubblers of McKinley so that the hydrogen sulfide content of the gas could be measured as it was separated from the low-sulfur product.

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yan in view of Longwell, and further in view of Clough (007), hereinafter referred to as Clough.

The discussion of Yan and Longwell in paragraphs 9 and 10 above, are herein incorporated by reference.

Neither Yan nor Longwell disclose copper iron as the promoter.

Clough discloses a process for removing organic sulfur from high-sulfur coals. The process includes first grinding the coal to a particle size as small as -200 mesh. The coals undergo heating with a promoter in what can be interpreted to be a promoter zone of the reactor. The promoter can be a mixture of copper +2 components and ferric ion components. The sulfur reduction is accomplished in by heating the coal at elevated temperatures, which can be accomplished by exposing the coal to superheated steam (Col. 6, lines 40-62; Col. 10, lines 25-43). Furthermore, using a mixture of copper +2 and ferric ion components increase effectiveness in promoting oxidation of the organic sulfur in the coal (Col. 10, lines 39-43).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to utilize the promoters of Clough in the process of Yan and Longwell in order to increase efficiency of desulfurizing the coal.

13. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yan in view of Longwell, and further in view of Meyer ('143), hereinafter referred to as Meyer.

Neither Yan nor Longwell disclose the rate of rise in temperature in the promoter zone and reaction zone as 5 degree Celsius per minute.

Meyer discloses a method of producing a particulate coal char wherein crushed coal is pyrolyzed or hydrolyzed to produce coal char (Col. 6, lines 34-50). The temperature and heating rates vary depending on pressures, composition of the charge, residence time, etc. Meyer discloses a heating rate for subbituminous coals of between about 1.5°C/min and 2.5°C/min, but notes that coals of higher rank require higher heating rates in order to prevent agglomeration, and such rates are chosen accordingly by those skilled in the art (Col. 8, lines 25-50). Therefore, it is the examiner's position that it would have been obvious to one of ordinary skill in the art at the time of invention by applicant to choose the instant claimed heating rate of 5°C/min in order to prevent agglomeration of the coals.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. 4233034, 4441886.

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15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Malini Krishnan whose telephone number is 571-272-6519. The examiner can normally be reached on Monday through Friday, 8:00 am - 5:00 pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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